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(54) Releasable laminate seal, as well as label or card using such laminate seal.

(57) A releasable laminated seal used for sealed label or card comprises a pair of transparent films made of a thermoplastic EVA composition mainly comprising about from 3 to 18 % by weight of vinyl acetate and about from 97 to 82 % by weight of ethylene while hot the mating under pressure. A sealed label or card can be made easily and simply by using the releasable laminate seal, integrating them to each other.

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## RELEASABLE LAMINATE SEAL, AS WELL AS LABEL OR CARD USING SUCH LAMINATE SEAL

The present invention relates to a releasable laminate seal for a label or card, as well as a label or card using such a releasable laminate seal. Specifically, the present invention concerns a label or card in which the printed surface of a label substrate etc. is usually covered by a laminate seal and can be revealed as required.

Such a type of labels or cards have mainly utilize pressure-sensitive adhesives as disclosed, for example, in Japanese Utility Model Publication No. Sho 55-36858 as a sealed sticker. In this sticker, the printed surface of a label paper is appended with a transparent film by means of strong adhesive layer and another label paper, i.e., cover seal is bonded releasably to the surface of the film by means of a weak adhesive layer.

If a user intends to peel off the cover seal, it can surely be defoliated from the surface of the film due to the difference between the adhesion strengths. Then, the user can enjoy the revealed prints on the substrate through the transparent film.

Recently, practical demands have been increased for sealed labels or cards, such as a lottery ticket with the prize number being usually sealed or a sealed postal card as the substitute for letter sealed in an envelope. Although there have been proposed various ideas for such goods, most of them utilize the difference of the adhesion strength as described above and, accordingly, involve the inconveniency that stickiness adhesives remains on the film surface after peeling of the cover seal.

Next, control for the difference of the adhesion strength between both sides of the film is not easy. If the adhesion to of the cover seal is too great, the film would be separated together with the cover seal to cause peeling injury at the surface of the paper substrate. On the contrary, if the adhesion to the seal is insufficient, cover seal may undesirably falls easily during usual handling.

In view of the above, the present inventor, et al have proposed a laminated label having a releasable bond face between adjacent film layers, for example, in Japanese Utility Model Laid-Open Nos. Sho 62-9279, 9280, etc. In our proposed label, a cover seal is releasably bonded to the surface of label paper by way of a film laminate comprising a pair of transparent layers made of thermoplastic resins of different with each other.

In this label, one of the film layers is supplied under melting between the cover seal and the other of the film layers and bonded firmly to the rear side of the cover seal while bonded only weakly to the surface of the other film. The adhesion formed between the pair of films is unique in that its

peeling strength can freely be varied over a wide range by controlling the melting temperature and selecting the combination for the materials of the two layers, and in that the surface of the films shows no tackiness at all after peeling off them.

Such peculiar adhesion between different thermoplastic layers is referred to as "pseude adhesion", which has now been utilized actually for many practical demands and we have also proposed several application uses, for example, in Japanese Utility Model Laid-Open Nos. Sho 63-21068 and 21069.

The feature that the "pseude adhesion" can be varied by the control for the temperature and the selection of thermoplastic resin material is excellent and convenient, but this has caused another problem. As is well-known, the temperature control is most delicate factor in the plastic fabrication and, accordingly, accurate setting of the pseude adhesion strength requires considerable skills. In addition, the optimal temperature for the desired adhesion strength varies depending on resin materials.

In view of the above, it is a first object of the present invention to provide a laminate seal comprising a pair of plastic films releasably joined to each other that can be used as an element for a label or card with releasable seal.

It is a second object of the present invention to provide a label with releasable seal that can be manufactured easily and at a reduced cost.

It is a third object of the present invention to provide a card with releasable seal that can be manufactured easily at a reduced cost and used conveniently.

The first object of the present invention can be attained by a releasable laminate seal used for sealed label or card, characterized in that it comprises a pair of transparent films prepared by blow molding a thermoplastic EVA composition mainly comprising about from 3 to 18 % by weight of vinyl acetate and about from 97 to 82 % by weight of ethylene at a molding die temperature of about from 120 to 210 °C into a hollow tubular film body and then urging, while hot, the mating wall surfaces of the molded tubular body under pressure thereby laminating and releasably integrating them to each other.

The second object of the present invention can be attained by a label with releasable seal having a label substrate one surface of which is to be printed or written with indication, a cover seal appended releasably over the printed or written surface of the label substrate and a releasable laminate seal put between the label substrate and the cover seal for releasably bonding the cover seal to the surface of

the label substrate, characterized in that the laminate seal includes a pair of transparent films made of a thermoplastic EVA composition mainly comprising about from 3 to 18 % by weight of vinyl acetate and about from 97 to 82 % by weight of ethylene prepared by thermal forming and by bonding with each other under pressure, and further in that the releasable laminate seal is bonded to the label substrate by means of a pressure-sensitive adhesive layer.

The third object of the present invention can be attained by a card with releasable seal comprising : a card substrate having one surface printed or written with information which is intended to be sealed.

a cover seal having high hiding power appended releasably over the card substrate and a releasable laminate seal put between the card substrate and the cover seal for releasably bonding the cover seal over the card substrate, characterized in that the releasable laminate seal comprises a pair of transparent films made of a thermoplastic EVA composition mainly comprising about from 3 to 18 % by weight of vinyl acetate and about from 97 to 82 % weight of ethylene prepared by thermal forming and by bonding with each other, while hot, under pressure in a state, and secured by means of a transparent adhesive layer over the printed or written surface of the card substrate and further, characterized in that

a peeling treatment is applied to the releasable boundary between the pair of films of the laminate seal along at least on peripheral portion thereof and a heat-sealing is applied further to the outer edge of the periphery applied with peeling treatment.

#### DETAILED DESCRIPTION OF THE INVENTION

A pair of transparent films made of a thermoplastic mainly comprising ethylene and vinyl acetate copolymer obtained from a thermal forming process are joined with each other under pressure while hot, and they form a releasable laminate seal incorporating a peelable face at the boundary between them. Such a laminated seal can preferably be prepared simply, for example, by blow molding of the ethylene-vinyl acetate copolymer (EVA composition) into a hollow tubular body at a molding die temperature from 120 to 210 °C and then subsequently urging the mating tubular film surfaces to each other.

The peelable bonding face at the boundary between the films shows peculiar adhesion property that the pair of transparent films are not separated with ease in usual handling but can be peeled from each other smoothly upon 180° or 90° peeling with a slight peeling strength of about

from several grams to about 50 grams/cm width depending on the EVA composition. The surface of the films after peeling shows no tackiness at all and does not lose its transparency. It is interesting and convenient that the adhesion strength between the films varies depending mainly on the EVA composition which can easily be changed and not depending so much on the thermal forming temperature which is difficult to control.

In the EVA composition, if the vinyl acetate content is increased, the peeling strength between the pair of the films is increased and it is preferably from 3 to 18 % by weight based on the total composition. If the vinyl acetate content is less than 3 % by weight, no substantial effect by the addition of the vinyl acetate can be obtained and, in addition, high molding temperature becomes necessary which is not so favorable in view of the production step. While on the other hand, if the vinyl acetate content exceeds 18 % by weight, the blow moldability of the composition becomes unstable, for example, no stable formation of the film from the ring die for the inflation molding can be attained.

The releasable laminate seal incorporating therein a peelable bond face can be applied in various practical application uses.

According to another feature of the present invention, the laminate seal described above can be applied to a label with releasable seal comprising a label substrate, a cover seal appended releasably over the label substrate and a laminate seal for bonding the cover seal releasably to the substrate.

Since the printed surface of the label substrate is usually sealed with the cover seal appended thereover, it can not be seen from the outside. Then, since the laminate seal comprising a pair of transparent EVA films peelable from each other is sandwiched between the label substrate and the cover seal, if a user intends to peel off the cover seal, peeling surely occurs at the peelable bond face between the pair of the transparent films and the cover seal can be removed smoothly while leaving the lower transparent film on the label substrate. Then, the user can see the printed matters on the label substrate through the transparent film. This is ensured by the remarkable difference between the peeling strength at the boundary of the pair of films which is about from several grams to about 50 grams/cm and the strength of the usual pressure sensitive adhesive between the lower film and the label substrate which is greater than about ten to several tens of times of the former. Since no tackiness remains on the surfaces of the films after peeling, there is no handling troubles of the label after peeling.

The label substrate may be of usual label pa-

per and any desired letters, symbols, pictures, etc. may be printed or written on the surface. The cover seal may be of usual label paper or any other material so long as it can be firmly bonded to the surface of the EVA laminated seal. In the case where the film thickness of the laminate is relatively thick, aluminum deposition or paint coating can be applied on the surface of the laminated seal for providing the laminate itself with the hiding power while saving the cover seal.

Although the peeling strength between the pair of EVA films is relatively low as compared with usual pressure sensitive adhesives, the laminated seal does not easily defoliate in usual handling. However, for preventing accidental or furtive peeling, it is desirable to apply heat-sealing or like other securing fabrication to the peripheral edge of the film laminate. Since the melting point of the EVA composition used in the present invention is relatively low, such heat sealing can be applied with ease.

Most practical and interesting application of the laminated seal as described above is a so-called postal card with releasable sealing as a substitute for letter sealed in envelope, etc.

The basic feature of the card with releasable seal is similar to that of the label with releasable seal described above. However, the conditions required upon using the postal cards, etc. are much more severe as those for the labels. At first, the sealed portion should never be revealed accidentally or furtively till the card is delivered to a recipient and, in this meaning, the pair of transparent EVA films constituting the laminate seal have to be bonded securely to each other. While on the other hand, the pair of films should be peeled off easily when the recipient intends to reveal the content of the card.

The card with releasable seal according to the present invention comprises a card substrate, a cover seal having a high hiding power appended over the card substrate and a laminated seal for releasably bonding the cover seal over the card substrate. Since the laminate seal sandwiched between the card substrate and the cover seal comprises a pair of transparent films peelable bonded with each other, the information printed or written on the surface of the card substrate is usually hidden by the cover seal appended thereover. Then, the cover seal can be revealed by the recipient by peeling the pair of transparent films while leaving the lower transparent film on the surface of the card substrate.

Particularly, in the card of the present invention, heat-sealing is applied to the pair of films along at least one peripheral edge thereof, and peeling fabrication such as slitting is applied at the inside of the heat-sealed edge.

Since the pair of the films are securely bonded to each other along the peripheral edge thereof, no one can furtively open the seal unless he breaks the sealed edge unrecoverably. When the recipient separates the heat-sealed edge, for example by cutting, he can easily peel the mating pair of films at the portion applied with peeling fabrication. The peeling region can be formed by merely applying slitting between the films along the inner side of the heat-sealed region and forming an incision, through the depth of the card, along the boundary between the heat-seal region and the releasing region. When the recipient bends the card along the incision, the end face of the laminate is revealed to facilitate the defoliation between the pair of the films.

Since the lower transparent EVA film is remained while being secured by means of pressure-adhesives on the printed surface of the substrate card, the content of the information can be read easily. In addition, since the film surface shows no tackiness, the card can be stored together with other paper documents without causing adhesion or absorption of the dusts.

The card according to the present invention can be embodied preferably, for example, in the form of a reply postal card in which a card substrate of a double-sized area is made foldable at the center thereof while sandwiching the laminate seal therebetween. The laminate seal is bonded to the mating surface of the foldable card substrate by means of pressure sensitive adhesive layers, etc.

In this case, the postal card is at first mailed to a recipient in the form in which mating two card halves are folded with each other. Then, the recipient defoliates the card at the peelable bond face of the laminated seal and then cuts and returns one-half of the card substrate as a usual postal card.

Of course, this postal card can be used not only as the reply card but also as usual cards, by which the amounts of information that can be contained in one card may be doubled as compared with usual, while keeping the content secret.

One simple way of manufacturing the above-mentioned reply postal card is to sandwich the laminated seal between upper and lower separate card substrates by means of pressure sensitive adhesive layers and applying heat-seal on one side edge of the laminated seal such as longitudinal side. Of course, protection heat-seal may be applied to other peripheral edge, etc.

The heat-sealed edge formed on one longitudinal side functions as a hinge when the card is unfolded and developed into individual card substrates. The card of this form can be manufactured by merely using a simple laminator.

## BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

Figure 1 is an explanatory view for manufacturing the releasable laminate seal according to the present invention by way of a blow molding process;

Figure 2 is an explanatory cross sectional view for one embodiment of a label with releasable seal according to the present invention in a state where the seal of the label is about to be peeled off from the label paper;

Figure 3 is an explanatory view for one embodiment of a card with releasable seal according to the present invention;

Figure 4 is a explanatory cross sectional view of the card shown in Figure 3;

Figure 5 is an explanatory view for another embodiment of the card with releasable seal according to the present invention in which the releasable laminate seal is sandwiched between a reply postal card ;

Figure 6 is an explanatory cross sectional view for the completed state of the postal card shown in Figure 5;

Figure 7 is an explanatory cross sectional view for a still further embodiment of the reply postal card according to the present invention; and

Figure 8 is an explanatory view for the card shown in Figure 7 in which the respective card substrates are unfolded while being joined along the heat-sealed portion as the hinge.

## DESCRIPTION OF PREFERRED EMBODIMENTS

Figure 1 shows an explanatory view in which a releasable laminate seal according to the present invention is manufactured by way of a blow molding process.

In Figure 1, an EVA copolymer powder (trade name : EF1010, manufactured by Asahi Kasei Co.,) with melt index of 1.0 g/10 min. and containing about 90 % by weight of ethylene and 10 % by weight of vinyl acetate is melted under heating in a screw cylinder of 40 cm diameter in a blow molding machine (not illustrated) at a temperature of about 130°C and then inflation-molded into a hollow tubular body F with 50  $\mu$ m film thickness from a ring die.

The thus formed cylindrical tubular product is urged above the cooling zone Z between a pair of press rollers R and R, by which the mating surfaces of the cylindrical films are integrated with each other and then allowed to cool.

As shown in Figure 1, the releasable laminate seal 1 thus obtained is applied with heat-seal along both edges thereof in the direction of the flow

between a pair of heat-seal rollers H and H. If required, both edges of the laminate seal 1 may previously be slit to a suitable width along the inside of the heat-sealed edge between the films 2 and 3 by using a slitter etc. for forming a peeling region between the films 2 and 3. Then, the laminate seal 1 is passed through a coating machine P to apply pressure-sensitive transparent adhesive layers 4 and 5 on both surface thereof and then further passed between append rollers T and T for appending silicon release papers 6 and 7 on both sides of the film laminate. In this laminated seal 1, the transparent film layers 2 and 3 are releasably bonded to each other at a peeling strength of about 20 g/cm width (180° peeling) at the peelable bond face S therebetween.

The film laminate 1 shown in Figure 1 can be used as an element for a label with releasable seal as shown in Figure 2.

In this embodiment, a releasable laminate seal comprising the transparent EVA film layers 2 and 3 as described above is bonded by means of a transparent pressure sensitive adhesive layer 5 to the printed surface of a label paper 8. Another label paper 9 is secured to the upper film 2 by means of an adhesive layer 4. Although not illustrated in the drawing, peeling treatment is applied by slitting the boundary between both of the film layers 2, 3 with a knife cutter and heat seal is applied at least to one edge to the outside thereof.

Since the printed surface of the label paper 8 is usually sealed by the top label paper 9, the printed matter is hidden and protected in the usual state. Then, when a user intends to reveal the printed surface, the heat-sealed edge (not illustrated) is cut-out to expose the lamination end face including the peelable edge. Since the film layers 2, 3 can easily be peeled from each other at the slit portion, the laminate seal 1 is defoliated starting from the portion A and then the peeling propagates to the entire surface. In this case, since the peeling strength between the films 2 and 3 is about 20 g/cm as described above, which is 1/10 or smaller than the adhesion strength of the pressure sensitive adhesive layer 5, the laminate seal 1 is never defoliated from the label paper 8 but peeling surely occurs at the bond face S between the film layers 2 and 3. Thus the top label paper 9 can smoothly be peeled off from the substrate 8 while leaving a lower transparent film layer 3 thereon.

Although not illustrated in the drawing, a pressure sensitive or heat sensitive color developing layer may be applied to the surface of the label paper 8. A color developing layer comprising, for example, a microcapsule type self-color developing agent well-known in the art may be used. In this case, the label user can print desired letters or symbols from above the label paper 9 and through

the laminate seal to the heat-sensitive or pressure-sensitive layer on the label substrate paper 8 by using a thermal printer or dot printer depending on the case.

Figure 3 and Figure 4 show another embodiment of the present invention in the form of a postal card with releasable laminate seal. In the figures, a laminate seal comprising a pair of transparent EVA film layers 12 and 13 as described above is sandwiched between a card substrate 18 and a cover seal 19 and secured by means of pressure adhesive layers 14 and 15. In this case, the boundary between the film layers 12 and 13 is applied with a peeling treatment by a cutter knife, etc. along one side edge, that is, a lower periphery 20 thereof to a predetermined width and, heat-sealing is applied to the edge outer to the slit portion 20, for example, at edge 16 and 17.

In this embodiment, private information that has to be kept secret such as the balance of deposit at a bank is printed on the surface of the card substrate 18 and such information is sealed by means of the cover seal 19 having high hiding power.

In order to provide the cover seal with such hiding power, it is desirable to apply, for example, aluminum vapor deposition on the rear face thereof. Since the card substrate 18 and the cover seal 19 are bonded by means of pressure adhesive layers 14 and 15 and the film laminated seal sandwiched therebetween, the cover seal 19 can not easily be detached from the card substrate 18.

Two parallel incisions are formed along the slit portion 20 through the cover seal 19 and the film layer 12 (13) (illustrated by the dotted lines in the lower portion of Figure 3).

Moreover, since the heat sealed edges 16 and 17 are formed on the upper and lower periphery of the laminate seal, peeling never occurs unless the heat-seal edge is broken.

Then, when the recipient intends to read the content on the card surface, he at first picks up the top B formed to the cover seal 19 and pull it along the incisions. Since the stripe-like portion 20 defined by the incisions is applied with slitting treatment between the layers 12 and 13, the stripe including the cover seal 19 and the upper film layer 12 can easily be removed rightwardly of the card while leaving the film layer 13. Since this reveals the end face of the slitted laminate seal along the upper incision, the cover seal 19 can easily be peeled up starting from the portion A. Then, the cover seal 19 is entirely be detached at the boundary between the film layers 12 and 13 while leaving the lower transparent film 13 on the surface of the printed card substrate 18 making it enable to read the printed information. Since the surface of the film 13 shows no tackiness at all after peeling, the card can be handled with ease.

Figure 5 shows another embodiment of the postal card with releasable seal according to the present invention. In this case, a releasable laminate seal 21 comprising a pair of transparent films 22 and 23 as described in previous embodiments is sandwiched by means of pressure sensitive adhesive layers 24 and 25 between a foldable card 30 comprising a pair of card substrates 28 and 29 in the form of a reply postal card.

As also shown in Figure 6, the film layers 22 and 23 are applied with heat-seal at the longitudinal edge 26 thereof. The heat seal may alternatively be applied along upper and lower edges thereof. Corresponding to the inside of the heat seal edges, an incision 27 is applied through the card substrate and the film laminate for opening the postal card.

The postal card is usually handled as a single card since the paired card substrates 28 and 29 are bonded by way of the laminate seal 21. The recipient can unfold the substrate cards 29 and 28 by cutting the card along the incision 27 to remove the heat-seal edge 26 and then peeling the film layers 22, 23 along the peeling stripe (for example, similar to the stripe 20 in Figure 3).

Figure 7 shows another embodiment of the reply postal card of the present invention. The postal card shown in Figure 7 is substantially the same as the card shown in Figure 6 except for replacing the one foldable card 30 comprising a pair of a pair of joined halves 28 and 29 in Figure 6 with two separate upper and lower card substrates 38 and 39. A laminate seal 31 comprising a pair of film layers 32 and 33 are sandwiched between the substrates 38 and 39 and heat sealing is applied along one longitudinal edge 34 of the film laminate 31. Heat seal is also applied along the opposing edges 35 for preventing accidental or furtive unfolding. In the Figure 7, 36 represents a slit portion for the trigger of peeling and 37 denotes an incision.

In this embodiment, the card substrates 38 and 39 are unfolded from each other in the same manner as in the embodiment of Figure 6 after removing the heat-sealed edge 35 along the incision 37 and starting peeling from the portion 36. In this case, although the card substrates 38 and 39 are separated, the left end of the cards are joined with each other by means of the heat-sealed edge 34 applied for the laminate seal 31 that functions as the hinge upon opening the card substrates.

As can be seen from Figure 7, the embodiment can be manufactured by merely laminating the card substrates 38, 39 and the heat-sealed laminated seal 31. It requires neither troublesome hand working nor complicate folding machine for preparing a reply postal card.

## Claims

1. A releasable laminate seal (1) used for sealed a label or card, characterized in that it comprises a pair of transparent films (2), (3) prepared by blow molding a thermoplastic EVA composition mainly comprising about from 3 to 18 % by weight of vinyl acetate and about from 97 to 82 % by weight of ethylene at a molding die temperature of about from 120 to 210 °C into a hollow tubular body (F) and then urging, while hot the mating wall surfaces of said molded tubular body under pressure thereby laminating and releasably integrating them to each other.

2. A laminated seal as defined in claim 1, characterized in that releasing paper (6, 7) is appended by way of a pressure sensitive adhesive layer (4, 5) to at least one side of said laminated seal (1).

3. A label with releasable seal having a label substrate (8) one surface of which is to be printed or written with indication, a cover seal (9) appended releasably over the printed or written surface of said label substrate (8) and a releasable laminate seal (1) put between said label substrate (8) and said cover seal (9) for releasably bonding said cover seal (9) to the surface of said label substrate (8), characterized in that said releasable laminate seal (1) comprises a pair of transparent films (2), (3) made of a thermoplastic EVA composition mainly comprising about from 3 to 18 % by weight of vinyl acetate and about from 97 to 82 % by weight of ethylene prepared by thermal forming process and by bonding with each other, while hot, under pressure, and further in that said releasable laminate seal (1) is bonded to said label substrate (8) by means of a pressure-sensitive adhesive layer (5).

4. A label as defined in claim 3, wherein the surface of the label substrate (8) bonded to the laminated seal is applied with a pressure-sensitive color developing layer.

5. A label as defined in claim 3, wherein the surface of the label substrate (8) bonded to the laminated seal is applied with a heat-sensitive color developing layer.

6. A card with releasable seal having a card substrate (18) having one surface printed or written with information which is intended to be sealed, a cover seal (19) having high hiding power appended releasably over said card substrate (18) and a releasable laminate seal put between said card substrate (18) and said cover seal (19) for releasably bonding the cover seal (19) over said card substrate (18), characterized in that said releasable laminate seal comprises a pair of transparent films (12), (13) made of a thermoplastic EVA composition mainly comprising about from 3 to 18 % by

weight of vinyl acetate and about from 97 to 82 % by weight of ethylene prepared by thermal forming and by bonding with each other, while hot, under pressure surface of the films (12), (13) are at least hot and further characterized in that

a peeling treatment is applied to the releasable boundary between the pair of films (12), (13) of the laminate seal along at least one peripheral portion (20) thereof and a heat-sealing is applied further to the outer edge (16), (17) of said periphery (20) applied with peeling treatment.

7. A card as defined in claim 6, characterized in that the pair of films (22), (23) of the laminate seal (21) are sandwiched between a pair of card substrates (28), (29), each one constituting a cover seal for another, joined foldably with each other and in which each outer surface of the pair of films (22), (23) is secure to each of the folded card substrates (28), (29) and said laminate seal (21) is fused securely by heat-sealing applied along at least one edge (26) thereof.

8. A card as defined in claim 6, characterized in that the cover seal (39) is constituted as another separate card substrate, and a pair of films (32), (33) of the laminate seal sandwiched between paired substrates are heat-sealed along one edge (34) thereof so that said laminated card substrates (40) can be unfolded into each of the card substrates (38), (39) while being joined with each other along said heat-sealed edge (34) as a hinge.

FIG. 1

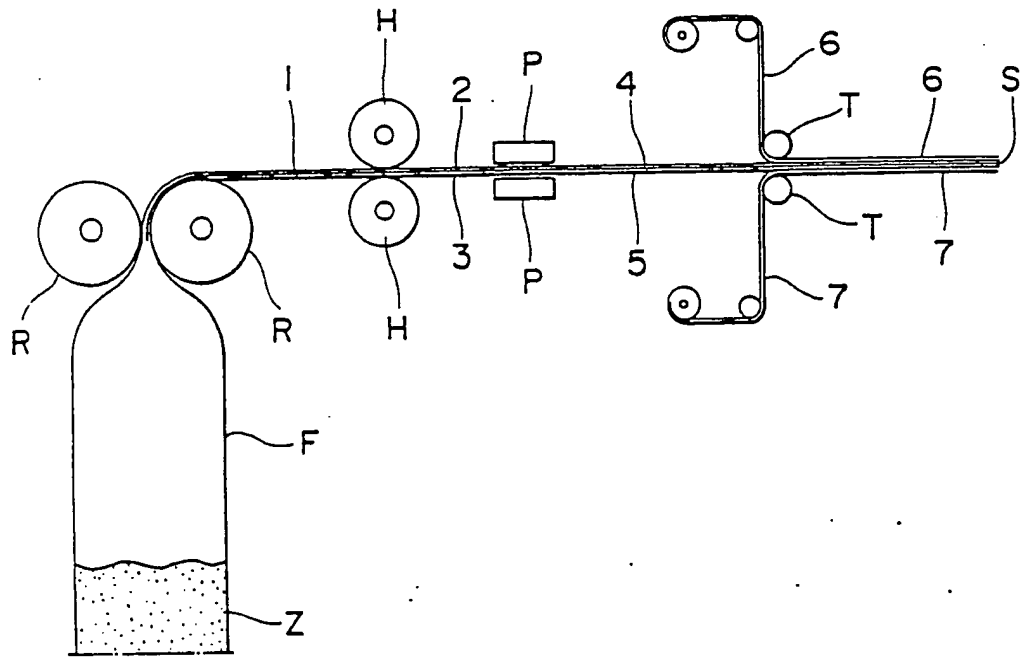


FIG. 2

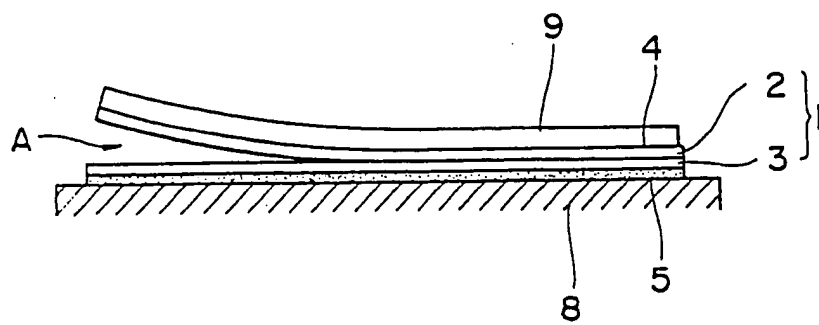




FIG. 3

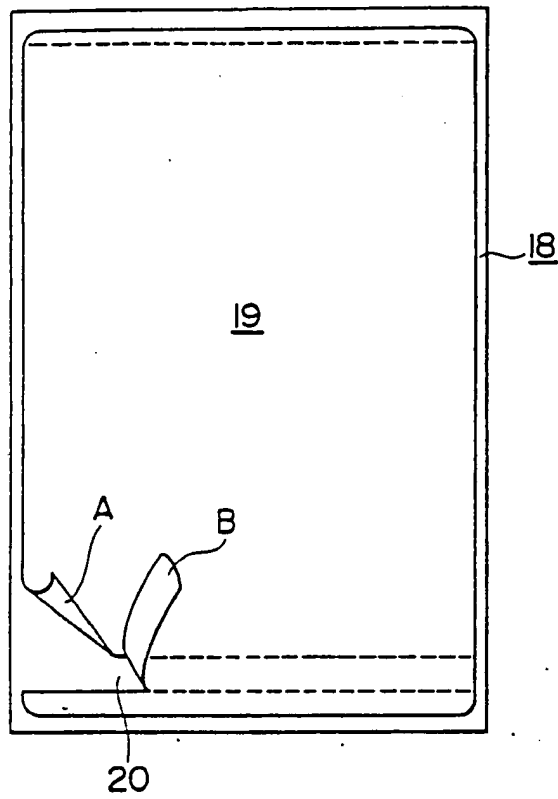


FIG. 4

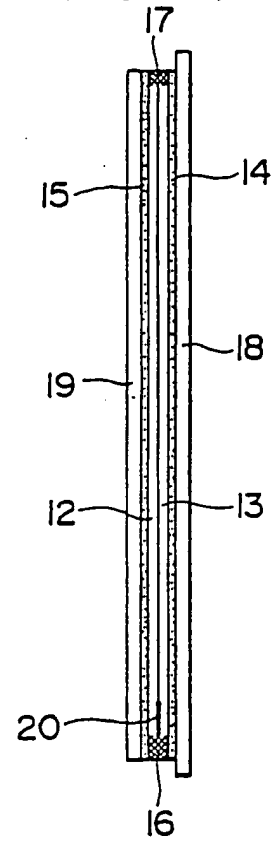


FIG. 5

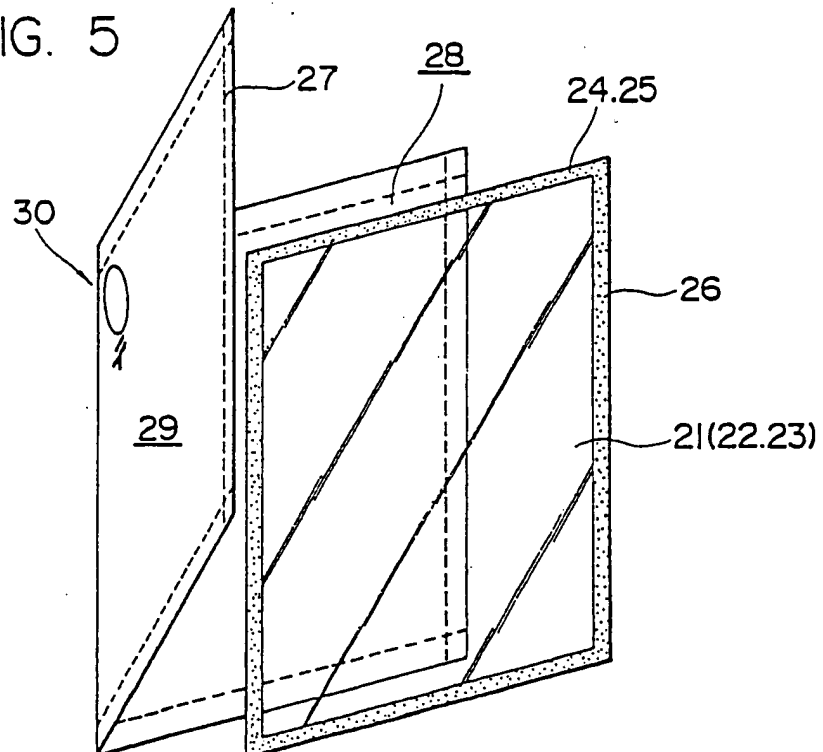


FIG. 6

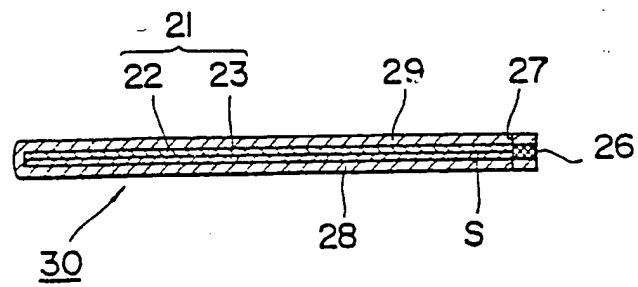


FIG. 7

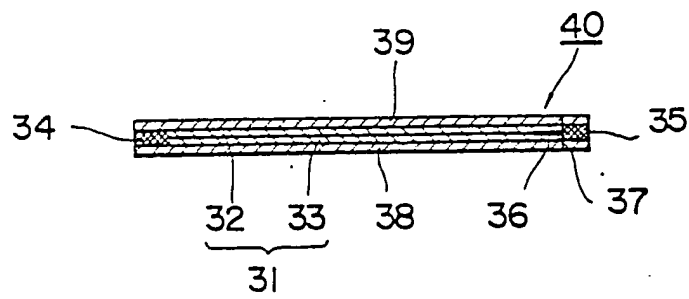


FIG. 8

